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TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
JP919990270US1

In Re Application Of: **Tetsuo Shibuya**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
09/737,190	December 14, 2000	Cheyne D. Ly	23389	1631	9159

Invention: **A METHOD FOR CHANGING A TARGET ARRAY, A METHOD FOR ANALYZING A STRUCTURE, AND AN APPARATUS, A STORAGE MEDIUM AND A TRANSMISSION MEDIUM THEREFOR**

COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Tetsuo Shibuya

Examiner: Cheyne D. Ly

Serial No.: 09/737,190

Art Unit: 1631

Filed: December 14, 2000

Docket: JP919990270US1 (14043)

For: A METHOD FOR CHANGING A TARGET ARRAY, A METHOD FOR ANALYZING A STRUCTURE, AND AN APPARATUS, A STORAGE MEDIUM AND A TRANSMISSION MEDIUM THEREFOR

Dated: February 14, 2005

Confirmation No.: 9159

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Pursuant to 35 U.S.C. 134 and 37 C.F.R. 41.37, entry of this Appeal Brief in support of the Notice of Appeal filed December 14, 2004 in the above-identified matter is respectfully requested.

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8(a)

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450, on February 14, 2005.

Date: February 14, 2005

John S. Sensny

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I. Statement of Real Party in Interest

The real party in interest in the above-identified patent application is the International Business Machines Corporation.

II. Statement of Related Proceedings

There are no prior or pending appeals or interferences related to this application to Appellant's knowledge.

III. Statement of Supporting Evidence

Applicants are not relying on any affidavits, extrinsic documents or extrinsic evidence.

IV. Statement of Claim Status and Appealed Claims

A. Claim Status

Claim 1 is withdrawn pursuant to a Restriction Requirement mailed January 7, 2003.

Claim 2 stands rejected under 35 U.S.C. 102(b) as being fully anticipated by U.S. Patent No. 5,369,577 (Kadashevich, et al.). Claim 2 stands further rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Claim 3 is withdrawn pursuant to a Restriction Requirement mailed January 7, 2003.

Claim 4 is withdrawn pursuant to a Restriction Requirement mailed January 7, 2003.

Claim 5 is withdrawn pursuant to a Restriction Requirement mailed January 7, 2003.

Claim 6 is withdrawn pursuant to a Restriction Requirement mailed January 7, 2003.

Claim 7 is withdrawn pursuant to a Restriction Requirement mailed January 7, 2003.

Claim 8 is withdrawn pursuant to a Restriction Requirement mailed January 7, 2003.

Claim 9 is withdrawn pursuant to a Restriction Requirement mailed January 7, 2003.

Claim 10 is withdrawn pursuant to a Restriction Requirement mailed January 7, 2003.
Claim 11 is withdrawn pursuant to a Restriction Requirement mailed January 7, 2003.

Claim 12 stand rejected under 35 U.S.C. 102(b) as being fully anticipated by U.S. Patent No. 5,369,577 (Kadashevich, et al.). Claim 12 stands further rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

B. Appealed Claims

Claims 2 and 12 are appealed. A clean copy of these claims is contained in Appendix A to this Appeal Brief.

V. Statement of Amendment Status

The Amendment After-Final Rejection filed November 18, 2004 was not entered. No other Amendments are pending.

VI. Statement/Explanation of Invention

The present invention, as defined by independent claims 2 and 12, relates to a method for changing, or transforming, an array in order to analyze its structure. The invention is very well suited for use with DNA and RNA representations, which are comprised of an array of four bases. The DNA representation is comprised of the elements A, T, C and G, and the RNA representation is comprised of the elements A, U, C and G (specification, page 19, lines 15-22).

The array being transformed is referred to as the target array (specification, page 6, lines 11 and 12). In a first array transformation procedure of this invention (specification, page 6, lines 11-22; Figure 4, steps 160-182), certain variables in the target array are replaced, or changed into, other variables that indicate whether that, or a complementary, variable occurs earlier in the array, and, if so, where that variable or its complement occurs earlier in the target array.

More specifically, the elements of a target array are looked at in a predetermined direction (specification, page 6, line 16; Figure 4, step 160), such as left to right. When a predefined variable is found that is the same as, or the complement of, an earlier variable in the array, that predefined variable is changed into information that indicates both (i) that the same variable or its complement occurs earlier, and (ii) how much earlier that variable, or its complement, occurs (specification, page 6, lines 12-17; Figure 4, step 170).

With this first transformation procedure, it is possible that two different target arrays might be transformed into identical arrays (specification, page 7, lines 18-24). When this happens, a second transformation procedure can be used that

changes the original target arrays into two different arrays (specification, page 8, line 20 - page 9, line 13; Figure 3, steps 130-152).

As explained in the present application, after the target arrays are transformed, they can be more easily analyzed to study the structure of the original arrays (specification, page 6, lines 4 and 5).

The specification (page 7, lines 4-11) gives an example of the first transformation procedure of the invention. In this example, the target array is: ABxByAzwz. This array is processed left to right, and the variables that are subject to being changed are w, x, y and z. Also, in this example, x and z are complementary, and y and w are complementary.

Proceeding left to right, the array is transformed as follows:

i) A stays A,
ii) B stays B,
iii) x is changed to 0 (because neither it nor its complement occurs earlier),
iv) B stays B,
v) y is changed to 0 (because neither it nor its complement occurs earlier),
vi) A stays A,
vii) z is changed to 4 (because its complement, x, occurs 4 locations earlier),
viii) w is changed to 3 (because its complement, y, occurs 3 locations earlier),
ix) z is changed to 6 (because its complement, x, first occurs 6 locations earlier).

The end result is that ABxByAzwz is changed to AB0B0A436.

VII. Statement/List of Each Ground for Review

1. Rejection of Claims 2 and 12 under 35 U.S.C. 112

a. The rejection

Claims 2 and 12 are rejected under 35 U.S.C. 112 on the same grounds. Specifically, the Examiner argues that:

"Claims 2 and 12 are vague and indefinite because it is unclear whether the target array, which is embodied in this method claim, is a mathematical array having a plurality of elements, or the representation of the elements generated an array apparatus" (Office Action, dated September 15, 2004, page 2, paragraph 6).

b. Argument

The rejection is respectfully traversed because the Examiner's argument is directed toward the breadth of the claim, not toward the clarity of the claim. As the Court of Customs and Patent Appeals stated in In re Miller, 169 USPQ 597 at 600, "breadth is not to be equated with indefiniteness."

Claim 2 describes the target array as "a target array consisting of a plurality of different elements," and Claim 12 describes the target array as "a target array including a plurality of different elements." This language is clear and understandable. For purposes of the present invention, any suitable target array can be used, and it does not matter how that array itself is generated or obtained. The elements of the array can be letters, numbers, or a combination of both, or other suitable elements.

Moreover, the specification discusses the target array and clearly describes several specific examples. The specification refers to a number of different target arrays that are well known in the art: DNA, RNA, p. 1, l. 25-29; character string, p. 1, l. 30 to p. 2, l. 6; suffix array, p. 3, l. 14-22; parameterized string, p. 4, l. 11-19; complementary array, p. 7, l. 4-11; non-complementary array, p. 7, l. 25-30. These arrays are all well known in the art and are referred to in the art as arrays. Accordingly, the definition in Claims 2 and 12 of the target array consisting of or including a plurality of different elements is believed to be consistent with art-recognized and well known terms of art and in full compliance with 35 USC §112.

It may be helpful to keep in mind that the purpose of 35 U.S.C. §112 is to ensure that those of ordinary skill in the art are reasonably apprised of the scope of the invention. "If the claims read in light of the specification reasonably apprise those skilled in the art of the invention, §112 demands no more "Miles Laboratories, Inc. v. Shandon, Inc., 27 USPQ2d 1123, 1126 (Fed. Cir. 1993) Cert. Denied, 510 U.S. 1100 (1994).

Claims 2 and 12 clearly satisfy this requirement and the Examiner's basis for the rejection of Claims 2 and 12 under 35 U.S.C. 112 is thus not well taken. The Board of Appeals is, consequently, respectfully asked to reverse this rejection of Claims 2 and 12.

2. Rejection of Claims 2 and 12 under 35 U.S.C. 102

a. The rejection

The Examiner has rejected Claims 2 and 12 under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent 5,369,577 (Kadashevich, et al.

b. U.S. Patent 5,369,577

Kadashevich, et al. discloses a word search procedure. In this procedure, a user provides an input word; and from this input word, a set of lexically related words is generated. A collection of words is then searched for any of those lexically related words.

More specifically, the patent to Kadashevich discloses and teaches a morphological analyzer and search engine that searches a collection of words based upon the input of a word to initiate the search. Kadashevich further teaches that the apparatus comprises a means for generating a first set of words, wherein the first set of words contains member words that are lexically related to the input word. Also disclosed is a search engine that searches a collection of words in order to detect the occurrence of any of the words from a group of search words, the group of search words including the input word and the first set of words.

Kadashevich refers to: a first set of words containing members that are lexically related to the input word, column (c.) l. 57-58; stripping suffixes from a word, c. 2, l. 2-4; parsing an input word to identify stems, c. 2, l. 16-17; a thesaurus database to generate a group of synonyms, c. 2, l. 33-38; a second group of words of synonyms with added suffixes, c. 2, l. 38-42; a first group of suffixes including inflectional and derivational suffixes, c. 3, l. 5-6; a second group of suffixes including suffixes that do not substantially change the meaning of words, c. 3, l. 14-17; conducting a morphological analysis of an input word form the root to the suffix, c. 3, l. 56-57; a topic structure 124 including a field 119 for an array of pointers and a field 117 for the number of bases within the array, c. 8, l. 25-31; traversing the lexicon tree, c. 23, l. 57-61, c. 25, l. 35 to c. 26, l. 42.

An important feature of the method and system disclosed in Kadashevich, et al. is the ability to perform full inflectional and derivational analysis of an input word. In addition, the procedure of Kadashevich, et al. is capable of recognizing multiple suffixes that are attached to a stem word.

c. Specific claim limitations not shown in Kadashevich, et al.

Kadashevich, et al. does not disclose the feature of replacing a variable in an array with information that represents the location of the same or a corresponding variable upstream in the array.

Specifically, Kadashevich, et al. does not teach the principle, described in Claim 2, of "replacing a variable in the first array that corresponds to a variable that corresponds to a variable that is included in the target array into information that represents a location of the same variable if it is present upstream."

Similarly, Kadashevich, et al. does not disclose the feature, described in Claim 12, of "traversing the target array in a predetermined direction and replacing in [a] first array

a corresponding occurrence of each variable in the target array with information that indicates that it is the first occurrence and replacing in the first array each corresponding subsequent occurrence of each variable in the target array with information that represents a location of the subsequent occurrence of each variable in the target array relative to a prior occurrence of each variable in the target array."

d. Argument

With respect to the above-described feature of the invention, the Examiner argues that, with the procedure disclosed in Kadashevich, et al:

> "[T]he analyzer traverses the lexicon tree (predetermined direction), checking all possible interpretations of each character in the input string. If the end of the input string is reached (location) at the same point that the end of a stem or suffix is reached, then the input word has been successfully parsed (column 23, line 53 to column 24, line 4; and column 25, Traversing the Lexicon §)" (Office Action dated September 15, 2004, page 4, paragraph 14).

Applicants respectfully submit that this feature of Kadashevich, et al. is not the same as the above-discussed limitations of Claims 2 and 12. Specifically, in Kadashevich, et al, there is no replacement of a variable with information identifying the location of the same or a corresponding variable located upstream in the array. The mere fact that, in Kadashevich, et al, the input word has been successfully parsed does not mean that any word has been replaced with the type of information described in Claims 2 and 12 of the present application.

Significantly, the Court of Appeals for the Federal Circuit emphasizes that a strict identity test must be met in order for a reference to anticipate a claim under 35 U.S.C. 102. For instance, in Apple Computer, Inc. v. Articulate Systems, Inc., 57 USPQ2d 1057, 1061 (Fed. Cir 2000), the Court explained that: "Anticipation under 35 U.S.C. 102 requires the disclosure in a single piece of prior art of each and every limitation of a claimed invention." "Substantial identity" or "equivalency" is not sufficient. RCA Corp. V. Applied Digital Data Sys., Inc., 221 USPQ 385 (Fed. Cir. 1984).

Because of the above-identified differences between Claims 2 and 12 of the patent application and Kadashevich, et al, this reference does not meet this strict identity text and, hence, does not anticipate either of these claims within the meaning of 35 U.S.C. 102.

VIII. Conclusion

For the reasons explained above, the Examiner's basis for rejecting Claims 2 and 12 under 35 U.S.C. 112 is not well taken. In particular, the term "target array" as used in these claims is clear and definite and well understood by those of ordinary skill in the art.

In addition, Kadashevich, et al. does not fully anticipate Claims 2 and 12 within the meaning of 35 U.S.C. 102. Specifically, this reference does not disclose the feature, as described in Claims 2 and 12, of replacing a variable in an array with information that represents the location of the same or a corresponding variable upstream in the array.

The Board of Appeals is thus respectfully requested to reverse the rejections of Claims 2 and 12 under 35 U.S.C. 102 and 112.

Respectfully submitted,

Dated: February 14, 2005

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Enclosure: Appendix A

APPENDIX A

Claim 1: (Withdrawn) A method for changing an array comprising the steps of:

changing a variable in a target array to information that represents the location of a different variable when said target array, consisting of a combination of a plurality of various kinds of elements is viewed along a path extending in a predetermined direction, and when a different, complementary variable is present upstream of a variable included in said target array;

changing said variable to information indicating that no different, complementary variable is present when no different, complementary variable is present upstream of said variable in said target array; and

repeating said steps for all the other variables included in said target array, so that said target array is changed.

Claim 2: A method for analyzing the data structure of a target array consisting of a plurality of different elements, the method comprising the steps of:

(a) generating a first array having elements corresponding to the elements of the target array, including the steps of:

(i) traversing said target array and replacing a variable in the first array that corresponds to a variable that is included in the target array <u>with</u> ~~into~~ information that represents a location of the same variable if it is present upstream with respect to said variable when the target array is traversed along a path extending in a predetermined direction;

(ii) replacing said variable in the first array with information that indicates if that said same variable is not present upstream with respect to the said variable; and

(iii) repeating steps (i)-(ii) for all the other variables included in the target array; and

(b) generating a second array having elements corresponding to the elements of the target array, including the steps of:

(i) traversing said target array and replacing a variable in the second array that is included in the target array with information that represents a location of said variable with respect to a different complementary variable present upstream with respect to said variable when the target array is traversed along a path extending in a predetermined direction;

(ii) replacing said variable in the second array with information that indicates if no other different complementary variable is present upstream with respect to said variable; and

(iii) repeating steps (i)-(ii) for all the other variables included in the target array; and

(c) analyzing the structure of the target array by using the first array and the second array.

Claim 3: (Withdrawn) The method according to claim 2, wherein a single suffix tree is prepared while said first and said second arrays are regarded as a single pair of corresponding character strings;

wherein, from among sequences of said first and said second arrays, which are provided as labels for edges of said single suffix tree, information that indicates the location of said same variable or said different variable that is not present in each of said sequences is replaced with information that indicates the absence of said same variable or said different variable; and

wherein said suffix tree is employed to analyze the structure of said target array.

Claim 4: (Withdrawn) The method according to claim 2, wherein said target array is changed to said first and said second arrays by using, as information that indicates the position of the different variable or the position of said same variable, numerical information that represents the number of elements arranged in said target array beginning at the position of a target variable and continuing up to the position of said same variable, or said different variable;

wherein, for said first and said second thus obtained arrays, all of said information indicating that said different variable or said same variable is not present in said target array is replaced with numerical information, obtained by inverting the positive and negative signs of said numerical information, indicating the number of elements that are present in another array at locations corresponding to said information;

wherein a suffix tree is prepared by regarding the obtained array as a character string; and

wherein, among the sequences of said obtained array that are provided as labels for edges of said suffix tree, numerical information indicating the positioning of said same variable or said different variable that is not present in each of said sequences is replaced with information indicating that said same variable or said different variable is not present; and

wherein said suffix tree is employed to analyze the structure of said target array.

Claim 5: (Withdrawn) The method according to claim 3, wherein said suffix tree is employed to extract a sequence that has the same structure and that frequently appears in said target array, so that said structure of said target array is analyzed.

Claim 6: (Withdrawn) The method according to claim 4, wherein said suffix tree is employed to extract a sequence that has the same structure and that frequently appears in said target array, so that said structure of said target array is analyzed.

Claim 7: (Withdrawn) The method according to claim 3, wherein said target array is an array where said first target array, first identification information, said second target array, first identification information, said second target array and second identification information are arranged in order; and wherein, when said suffix tree is employed to search for said common sequence for said first and said second arrays, said structures of said first array and said second array are analyzed.

Claim 8: (Withdrawn) The method according to claim 4, wherein said target array is an array where said first target array, first identification information, said second target array, first identification information, said second target array and second identification information are arranged in order; and wherein, when said suffix tree is employed to search for said common sequence for said first and said second arrays, said structures of said first array and said second array are analyzed.

Claim 9: (Withdrawn) An apparatus for analyzing the structure of an array comprising:

first conversion means for converting a target array consisting of a combination of a plurality of different kinds of elements into a first array by changing a variable that is replaceable with another element in said target array into information representing the location of the same variable when said target array is viewed along a path extending in a predetermined direction, and when said same variable is present upstream of said variable, and by changing, when said same variable is not present upstream of said replaceable variable in said target array, all the variables in said target array into information indicating that said same variable is not present;

second conversion means for changing said target array into a second array by changing a replaceable variable in a target array into information representing the location of the different variable when said target array is viewed along a path extending in a predetermined direction, and when a different variable that is complementary is present upstream of said replaceable variable and by changing, when said different variable is not present upstream of said replaceable variable in said target array, all the variables in said target array into information indicating that said different variable is not present; and

analyzation means for employing said first and said second arrays to analyze the structure of said target array.

Claim 10: (Withdrawn) A storage medium on which a program is stored to permit a computer to perform processing comprising:

a step of converting a target array consisting of a combination of a plurality of different kinds of elements into a first array by changing a variable that is replaceable with

another element in said target array into information representing the location of the same variable when said target array is viewed along a path extending in a predetermined direction, and when said same variable is present upstream of said variable, and by changing, when said same variable is not present upstream of said replaceable variable in said target array, all the variables in said target array into information indicating that said same variable is not present;

a second step of changing said target array into a second array by changing a replaceable variable in a target array into information representing the location of the different variable when said target array is viewed along a path extending in a predetermined direction, and when a different variable that is complementary is present upstream of said replaceable variable, and by changing, when said different variable is not present upstream of said replaceable variable in said target array, all the variables in said target array into information indicating that said different variable is not present; and

a third step of employing said first and said second arrays to analyze the structure of said target array.

Claim 11: (Withdrawn) A transmission medium for transmitting a program to permit a computer to perform processing comprising:

a step of converting a target array consisting of a combination of a plurality of different kinds of elements into a first array by changing a variable that is replaceable with another element in said target array into information representing the location of the same variable when said target array is viewed along a path extending in a predetermined direction, and when said same variable is present upstream of said variable, and by changing, when said

same variable is not present upstream of said replaceable variable in said target array, all the variables in said target array into information indicating that said same variable is not present;

a second step of changing said target array into a second array by changing a replaceable variable in a target array into information representing the location of the same variable when said target array is viewed along a path extending in a predetermined direction, and when a different variable that is complementary is present upstream of said replaceable variable, and by changing, when said different variable is not present upstream of said replaceable variable in said target array, all the variables in said target array into information indicating that said different variable is not present; and

a third step of employing said first and said second arrays to analyze the structure of said target array.

Claim 12: A method for analyzing the data structure of a target array including a plurality of different elements, the method comprising the steps of:

(a) generating a first array having elements corresponding to the elements of the target array, traversing the target array in a predetermined direction and replacing in the first array a corresponding first occurrence of each variable in the target array with information that indicates that it is the first occurrence and replacing in the first array each corresponding subsequent occurrence of each variable in the target array with information that represents a location of the subsequent occurrence of each variable in the target array relative to a prior occurrence of each variable in the target array;

(b) generating a second array having elements corresponding to the elements of the target array, traversing the target array in a predetermined direction and replacing in the

second array a corresponding first occurrence of each variable in the target array with information that indicates that that it is the first occurrence, replacing in the second array a corresponding next occurrence of a variable in the target array that is a complement to the first occurrence of each variable with information that represents a location of the next occurrence of the variable in the target array relative to the first occurrence of each variable, and replacing in the second array each corresponding subsequent occurrence of a variable in the target array having a previous occurrence of its complement with information that represents a location of the subsequent occurrence of the variable relative to the previous occurrence of its complement; and

(c) analyzing the structure of the target array by using the first array and the second array.